

(12) UK Patent Application (19) GB (11) 2 085 780 A

- (21) Application No 8034118
- (22) Date of filing 22 Oct 1980
- (43) Application published
6 May 1982
- (51) INT CL³
B23D 37/22 43/02
- (52) Domestic classification
B3L 2C1B 3F
- (56) Documents cited
None
- (58) Field of search
B3D
B3L
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(54) Apparatus for removing flash from the inside surface of welded pipes

(57) The apparatus comprises a body (1) on which V-shaped two-arm levers (6) are mounted around its periphery. A cutting tool holder (2) is pivoted to one arm (7) of each of the levers (6). On the body (1) there are mounted drives (10) for turning the levers (6) and each connected with the other arm (9) of each of said levers (6). On the front ends and the rear ends of the cutting tool holders (2) there are mounted rollers (11) and (12). The tool holders 2 are brought from the retracted position, Figure 4, into contact with the inside surface of the pipe 3, Figure 1 by the drives 10. The cutting tool holders (2) hold cutting tools rigidly secured thereto.

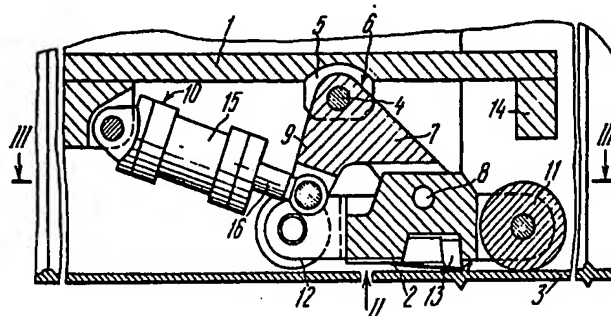


FIG. 1

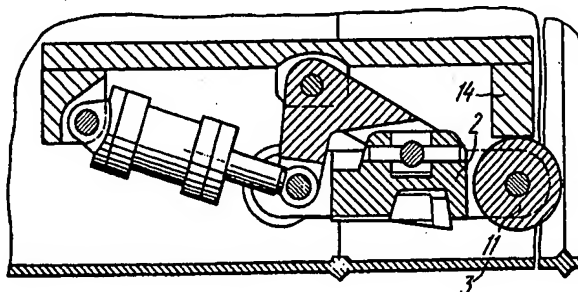


FIG. 4

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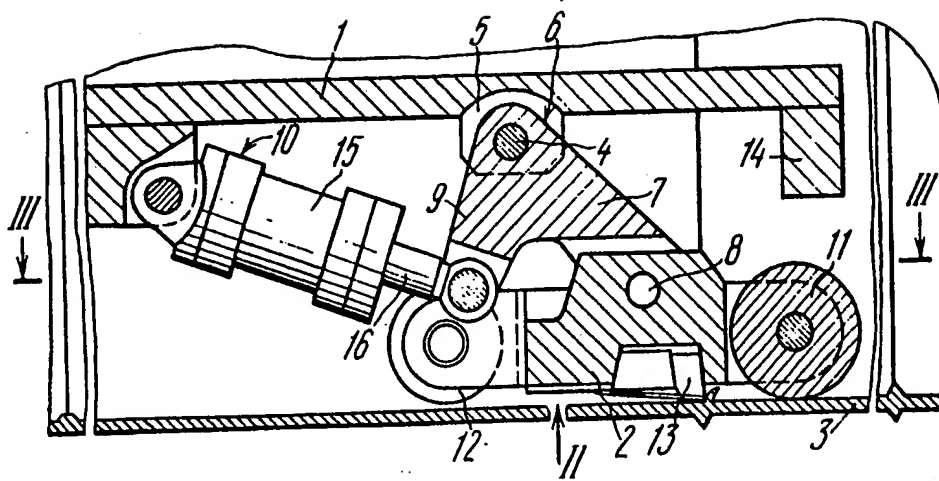


FIG. 1

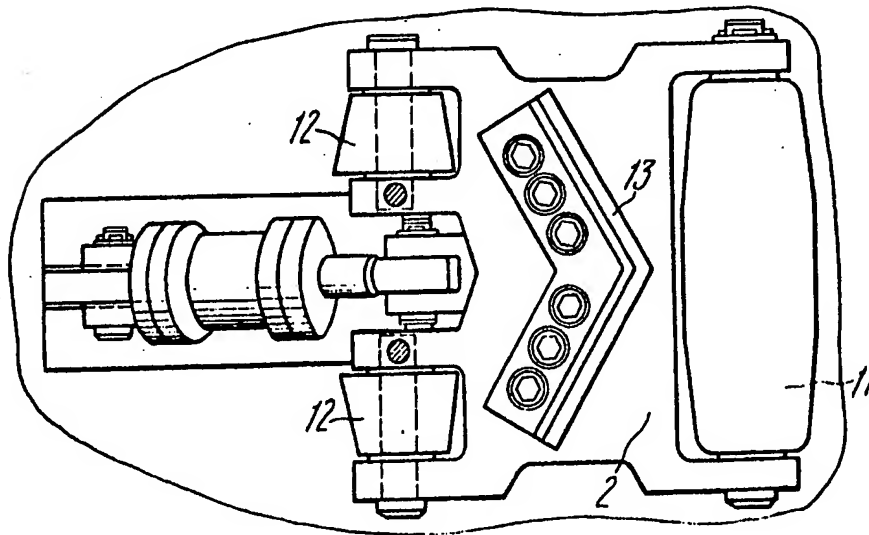


FIG. 2

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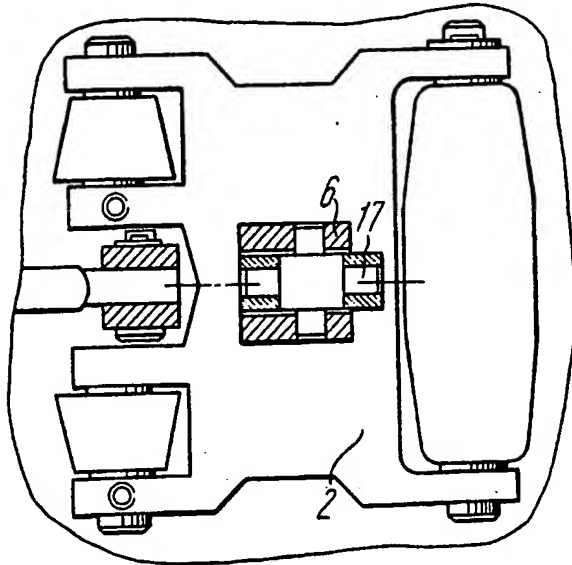


FIG. 3

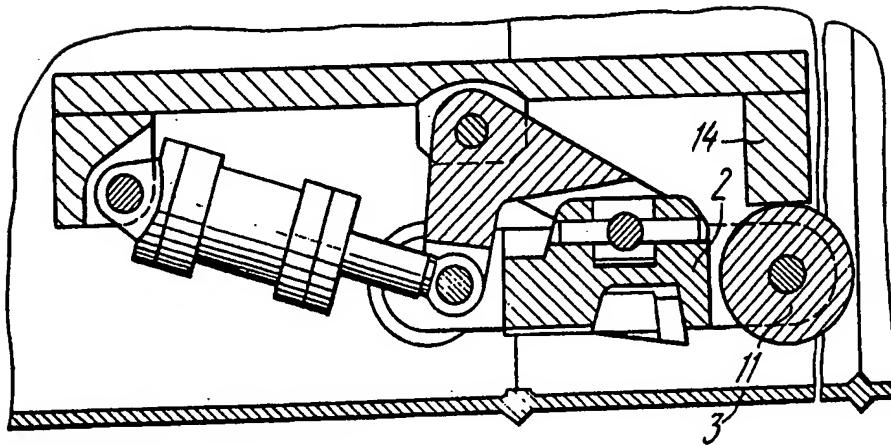


FIG. 4

SPECIFICATION

Apparatus for removing flash from the inside surface of welded pipes

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The present invention relates to auxiliary welding equipment and particularly to apparatus for removing flash from the inside surface of the weld-joined pipes. Most successfully the invention can be used in

10 laying trunk pipelines as well as in welding casing pipes.

The apparatus for removing flash from the inside surface of the pipes have been used for a comparatively long time. Despite this fact, however, the

15 above apparatus are short-lived and unreliable in operation. Besides, weld-joined pipes are often damaged in the course of removing flash with the aid of such apparatus. The present invention has as its aim to solve this problem and to overcome the

20 above disadvantages.

According to the present invention there is proposed an apparatus for removing flash from the inside surface of welded pipes which comprises a

25 body, V-shaped two-arm levers mounted on the periphery of the body and pivoted each to one arm of each of said levers, drives for turning the levers and secured to the body and each connected with the other arm of each of said levers, rollers mounted

30 on the front and the rear ends of the cutting tool holders and in contact with the inside surface of the pipe, cutting tools rigidly secured to said cutting tool holders.

Such an arrangement allows the cutting tool

35 holders to be in spaced relationship with the pipe when the apparatus is in the transport position and makes it possible to substitute the sliding friction of the supporting members by the rolling friction when the apparatus is in the operating position, thereby

40 appreciably facilitating the movement of the apparatus within the pipe. At the same time, this decreases the wear of the supporting members (rollers) and permits the period between repairs to be increased several times. The abrasive wear in the

45 apparatus of the present invention is so insignificant that any dangerous increase in the cutting depth is practically excluded. Thus the total combination of features of the apparatus of the present invention makes it possible to attain a novel result, namely to

50 increase the period between repairs several times as compared with that of similar conventional apparatus, to appreciably reduce the power consumption and engine power required for the movement of the apparatus within pipes, and to substantially rule out

55 the possibility of damaging of the pipe walls and weld in the course of flash removal.

The simplest in construction and most reliable in operation is such a modification of the apparatus wherein said drive for turning each lever is made in

60 the form of a power cylinder pivoted to the arm of the lever and to the body.

It is advisable that the roller mounted on the front end of each cutting tool holder be wider than the cutting tool held in this cutting tool holder. This

65 makes it possible to prevent a contact between the

cutting tool and the pipe even if the latter is considerably elliptical, or if there are dents on the pipe. At the same time this structural feature prevents a contact between the cutting tool and a

70 longitudinal weld if any.

When using the apparatus under consideration for removing flash from casing pipes and from small-diameter pipes, it is necessary that the rollers mounted on the front ends of the cutting tool holders

75 be tapering to their ends. This structural feature enhances the accuracy of following the configuration of the inside surface of the pipe by the rollers.

This very result can be achieved by a modification of the apparatus wherein the cutting tool holders are

80 mounted on V-shaped two-arm levers by means of jibbal joints.

Now the invention will be described by way of specific embodiments thereof with reference to the accompanying drawings wherein:

85 *Figure 1* is an elevational view of an apparatus for removing flash from the inside surface of welded pipes, according to the invention;

Figure 2 is the apparatus of the present invention as viewed in the direction of arrow II in *Figure 1*,

90 without showing the pipes being welded;

Figure 3 is a section of the apparatus of the present invention, taken along line III-III in *Figure 1*;

Figure 4 is an elevational view of the apparatus of the present invention at the moment of transportation.

95 An apparatus for removing flash from the inside surface of welded pipes comprises a body 1 (*Figure 1*), a drive for moving the apparatus, and supporting wheels (not shown). Around the periphery of the

100 body 1 there are mounted radially movable cutting tool holders 2. Since all the cutting tool holders 2 are similar in construction, *Figure 1* shows only one cutting tool holder 2, a portion of the body 1, and a wall of a welded pipe 3.

105 On the body 1 there are mounted V-shaped two-arm levers 6 by means of cylindrical pivots 4 and 5. One arm 7 of each of the levers 6 carries one cutting tool holder 2 by means of a pivot 8. The other arm 9 of each lever 6 is pivotally connected with a

110 drive 10 for turning this lever 6. The drive 10 is mounted on the body 1 and serves as a means for pressing the cutting tool holder 2 to the pipe 3. Each cutting tool holder 2 has supporting members which in the operating position are in contact with the

115 inside surface of the welded pipe 3. The supporting members are made in the form of rollers 11 and 12 mounted on the front end and the rear end of each cutting tool holder 2. Cutting tools 13 are rigidly fixed to the cutting tool holders 2.

120 On the body 1 there are provided stops 14 disposed opposite the front ends of the cutting tool holders 2.

The simplest in construction and most reliable in operation is a modification of the apparatus wherein

125 each drive 10 for turning the respective lever 6 is made in the form of a power cylinder 15. A rod 16 of the power cylinder 15 is pivotally connected with the arm 9 of the lever 6. The power cylinder 15 is pivotally connected to the body 1. All the power

130 cylinders 15 are connected with a hydraulic control

system or a pneumatic control system (not shown).

According to the preferred embodiment of the invention shown in Figure 2 the apparatus has one roller 11 mounted on the front end of each cutting tool holder 2 and two rollers 12 mounted on the rear end of this same cutting tool holder 2.

The roller 11 mounted on the front end of each cutting tool holder 2 is, according to the invention, wider than the cutting tool 13 held in this cutting tool holder 2. Each such roller 11 is tapering to its ends.

The rollers 12 mounted on the rear ends of the cutting tool holders are conical.

For more accurate following the configuration of the inside surface of the pipe 3 by the rollers, each cutting tool holder 2, according to one of preferred embodiments of the invention (Figure 3) is mounted on the respective V-shaped two-arm lever 6 by means of a jibbal joint 17. This mounting is illustrated in Figure 4 where the cutting tool holder 2 is shown in the transport position.

The above-described apparatus operates in the following way.

The drives 10 (Figure 1) such as power cylinders 15, turn the levers 6 so that the cutting tool holders 2 occupy the transport position shown in Figure 4. In this position the roller 11 of each cutting tool holder 2 is pressed against the respective stop 14. With the aid of a drive incorporated in the apparatus or disposed outside of the pipe 3 the apparatus is moved to the weld covered with flash. Some distance from the weld to be treated the apparatus is stopped.

The drives 10, such as the power cylinders 15, turn the levers 6 so that the cutting tool holders 2 move radially to the inside surface of the pipe 3 (see Figure 1) until the rollers 11 come into contact with the pipe 3. Then the apparatus is moved to the weld to be treated. The drive (not shown) moving the apparatus overcomes but a slight resistance caused by the rolling friction of the supporting wheels (not shown) and the rollers 11. If there are deformed portions on the walls of the pipe 3, such as dents forming bulges on the inside surface of the pipe 3, the roller 11 rolls over such a bulge, turns the cutting tool holder 2 about the pivot 8 and thereby diverts the cutting edge of the cutting tool 13 from the deformed portion of the pipe wall. When the cutting tool holder 2 turns, the rear rollers 12 of this cutting tool holder 2 come into contact with the non-deformed portion of the pipe 3.

In this way the cutting tool holder 2 rolls over the deformed portion of the pipe 3 so that the cutting tool 13 does not damage the pipe wall.

Having approached the weld to be treated, the apparatus moves on, and the rollers 11 turn the cutting tool holders 2 and roll over the flash.

It will be understood that even with a considerable ellipticity of the pipe 3 none of the cutters 13 will damage the pipe wall because each roller 11 is, according to the preferred embodiment of the invention, wider than the respective cutting tool 13.

If the pipe 3 is locally deformed close to the weld, the apparatus makes it possible to properly remove the flash from the adjacent sections of the weld without damaging the deformed portion of the pipe.

In particular, the roller 11 (see Figure 3) rolls over the locally deformed portion of the pipe 3 and thereby causes the respective cutting tool holder 2 to turn relative to two mutually perpendicular axes, one of which axes coincides with the direction of the apparatus movement, whereas the other is perpendicular thereto. As a result, the portion of the cutting tool 13 disposed behind this roller 11 will pass over the deformed portion of the pipe 3 and will cut off the flash therefrom, whereas the other portion of the cutting tool 13 will cut off the flash in proximity to the locally deformed portion.

As soon as the flash is removed, the drives 10, such as power cylinders 15 (Figure 1), operate and turn the levers 6 so that the cutting tool holders 2 occupy the transport position shown in Figure 4.

The apparatus moves out of the pipe.

While particular embodiments of the invention have been shown and described, various modifications thereof will be apparent to those skilled in the art and therefore it is not intended that the invention be limited to the disclosed embodiments or to the details thereof and the departures may be made therefrom within the spirit and scope of the invention as defined in the claims.

CLAIMS

1. An apparatus for removing flash from the inside surface of welded pipes, comprising: a body; V-shaped two-arm levers mounted on said body; cutting tool holders disposed around the periphery of said body and pivoted each to one arm of each of said levers; drives for turning said levers and mounted on said body and each connected with the other arm of each of said levers; rollers mounted on the front end and the rear end of said cutting tool holders and being in contact with the inner surface of the pipe; cutting tools rigidly attached to said cutting tool holders.

2. An apparatus as claimed in claim 1, wherein said drive for turning said lever is made in the form of a power cylinder pivoted to the arm of said lever and to the body.

3. An apparatus as claimed in claim 1 wherein the roller mounted on the front end of each cutting tool holder is wider than the cutting tool held in this cutting tool holder.

4. An apparatus as claimed in claim 3, wherein said rollers mounted on the front ends of the cutting tool holders are tapering to their ends.

5. An apparatus as claimed in claim 3, wherein said cutting tool holders are mounted on the V-shaped two-arm levers by means of jibbal joints.

6. An apparatus for removing flash from the inside surface of welded pipes substantially as hereinbefore described with reference to, and as shown in the accompanying drawings.